

CLAIMS

What is claimed is:

1. A radiation-curable composition comprising:
 - (a) an acrylate oligomer having a polytetramethylene glycol backbone;
 - (b) an acrylate monomer; and
 - (c) at least three photoinitiators.
2. The radiation-curable composition of claim 1, wherein said acrylate monomer is propoxylated nonyl phenol acrylate.
3. The radiation-curable composition of claim 1, wherein said oligomer is derived from:
 - (i) one or more polytetramethylene glycols;
 - (ii) isophorone diisocyanate, dicyclohexylmethane diisocyanate, and/or the trimer of hexamethylene diisocyanate; and
 - (iii) hydroxyethylacrylate.
4. The radiation-curable composition of claim 3, wherein said oligomer has a molecular weight in the range of 2,000-6,000 g/mol.
5. The radiation-curable composition of claim 1, wherein said oligomer is derived from, relative to the total weight of the oligomer:
 - (i) 10-30 wt% of isophorone diisocyanate;
 - (ii) 5-15 wt% of dicyclohexylmethane diisocyanate;
 - (iii) 45-75 wt% of polytetramethylene glycol; and
 - (iv) 5-20 wt% of hydroxyethylacrylate.

6. The radiation-curable composition of claim 2, wherein said oligomer is derived from, relative to the total weight of the oligomer:

- (i) 10-30 wt% of isophorone diisocyanate;
- 5 (ii) 5-15 wt% of dicyclohexylmethane diisocyanate;
- (iii) 45-75 wt% of polytetramethylene glycol; and
- (iv) 5-20 wt% of hydroxyethylacrylate.

7. The radiation-curable composition of claim 1, wherein said acrylate monomer is hexane diol diacrylate.

8. The radiation-curable composition of claim 1, wherein said oligomer is derived from:

- 15 (i) one or more polytetramethylene glycols;
- (ii) isophorone diisocyanate and/or dicyclohexylmethane diisocyanate;
- (iii) hydroxyethylacrylate; and
- (iv) optionally, hexane diol and adipic acid.

9. The composition of claim 8, wherein said oligomer has a molecular weight of 1,000-5,000 g/mol.

10. The radiation-curable composition of claim 1, wherein said oligomer is derived from, relative to the weight of the oligomer:

- (i) 25-35 wt% of isophorone diisocyanate and/or dicyclohexylmethane diisocyanate;
- (ii) 25-40 wt% of polytetramethylene glycol;
- 30 (iii) 15-30 wt% of hydroxyethylacrylate;
- (iv) 5-15 wt% of hexane diol; and
- (v) 5-15 wt% of adipic acid.

11. The radiation-curable composition of claim 7, wherein said oligomer is derived from, relative to the weight of the oligomer:

- (i) 25-35 wt% of isophorone diisocyanate and/or dicyclohexylmethane diisocyanate;
- (ii) 25-40 wt% of polytetramethylene glycol;
- (iii) 15-30 wt% of hydroxyethylacrylate;
- (iv) 5-15 wt% of hexane diol; and
- (v) 5-15 wt% of adipic acid.

12. The radiation-curable composition of claim 1, wherein said composition further comprises a silane coupling agent.

13. The radiation-curable composition of claim 1, wherein said radiation-curable composition, when cured at a dose of about 4.4 mJ/cm², has a percentage reacted acrylate unsaturation of at least 56%.

14. The radiation-curable composition of claim 1, wherein said radiation-curable composition, when cured at a dose of about 4.4 mJ/cm², has a percentage reacted acrylate unsaturation of at least 60%.

15. The radiation-curable composition of claim 1, wherein said radiation-curable composition, when cured at a dose of about 4.4 mJ/cm², has a percentage reacted acrylate unsaturation of at least 66%.

16. The radiation-curable composition of claim 1, wherein said radiation-curable composition cures faster than a comparable composition, said comparable composition being identical to said radiation-curable composition except that said at least three

photoinitiators in said radiation-curable composition have been replaced in said comparable composition with an equal weight amount of 1-hydroxy-cyclohexyl-phenyl ketone photoinitiator.

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17. The radiation-curable composition of claim 16, wherein said at least three photoinitiators include 1-hydroxy-cyclohexyl-phenyl ketone.

10 18. The radiation-curable composition of claim 1, wherein said oligomer comprises an aromatic group.

19. The radiation-curable composition of claim 1, wherein said oligomer is an aliphatic oligomer.

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20. The radiation-curable composition of claim 3, wherein said composition is an inner primary coating composition for optical fibers.

- 20 21. A radiation curable composition comprising:
- (a) an oligomer derived from, relative to the weight of the oligomer:
 - (i) 10-30 wt% of isophorone diisocyanate;
 - (ii) 5-15 wt% of dicyclohexylmethane
 - 25 diisocyanate;
 - (iii) 45-75 wt% of polytetramethylene glycol;
 - and
 - (iv) 5-20 wt% of hydroxyethylacrylate;
 - (b) an alkoxyated alkyl substituted phenol
 - 30 acrylate;
 - (c) a photoinitiator; and
 - (d) a silane coupling agent;

wherein said composition, when cured at a dose of about 4.4 mJ/cm², has a percentage reacted acrylate

unsaturation of at least 60%.

22. The radiation-curable composition of claim 21,
wherein said radiation-curable composition, when cured
5 at a dose of about 4.4 mJ/cm², has a percentage reacted
acrylate unsaturation of at least 66%.

23. A radiation curable composition comprising:

- (a) an oligomer derived from
 - 10 (i) one or more polytetramethylene glycols;
 - (ii) isophorone diisocyanate and/or
dicyclohexylmethane diisocyanate;
 - (iii) hydroxyethylacrylate; and
 - (iv) optionally, hexane diol and adipic acid;
- 15 (b) hexanediol di(meth)acrylate; and
- (c) a photoinitiator;

wherein said radiation-curable composition, when
cured at a dose of about 4.4 mJ/cm², has a percentage
reacted acrylate unsaturation of at least 56%.

20 24. The composition of claim 23, further comprising a
polydimethyl siloxane compound.

25 25. The composition of claim 23, wherein said oligomer
is derived from, relative to the total weight of said
oligomer:

- (i) 25-35 wt% of isophorone diisocyanate and/or
dicyclohexylmethane diisocyanate;
- (ii) 25-40 wt% of polytetramethylene glycol;
- 30 (iii) 15-30 wt% of hydroxyethylacrylate;
- (iv) 5-15 wt% of hexane diol; and
- (v) 5-15 wt% of adipic acid.

26. The radiation-curable composition of claim 23, wherein said radiation-curable composition, when cured at a dose of about 4.4 mJ/cm², has a percentage reacted acrylate unsaturation of at least 60%.

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27. The radiation-curable composition of claim 23, wherein said radiation-curable composition, when cured at a dose of about 4.4 mJ/cm², has a percentage reacted acrylate unsaturation of at least 66%.

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28. The radiation-curable composition of claim 23, wherein said composition is an outer primary coating composition for optical fibers.

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29. The radiation-curable composition of claim 23, wherein said oligomer comprises a polyether oligomer and a polyester oligomer.

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